

REMARKS/ARGUMENTS

Claims 1, 6, 7, and 17 were objected to for typographical errors. Claim 6 has been cancelled and claims 1, 7, and 17 have been amended as suggested by the Examiner. Claims 1, 2, 4-8, 10-14, 16-18, and 20 have been rejected. Applicants respectfully request reconsideration of the application in view of the following remarks submitted in support thereof.

Rejections under 35 U.S.C. § 103

Claims 1, 2, 4, 7-8, 10-14, 17, 18, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,974,544 to Jeffries et al. (Jeffries) in view of U.S. Patent No. 6,138,176 to McDonald et al. (McDonald). As will be fully explained below, the combination of Jeffries in view of McDonald does not raise a *prima facie* case of obviousness against independent claims 1, 7, 12, and 17 as amended. Furthermore, the combination of these references would not have resulted in a method and an apparatus that include all of the features specified in independent claims 1, 7, 12, and 17 as amended.

The Examiner asserts that Jeffries discloses accumulating a plurality of commands in a queue, examining the commands in the queue for like commands, and examining the like commands to determine whether they are contiguous. The Examiner acknowledges that Jeffries does not teach that each read and write command includes a command data block (CDB) and a scatter gather list (SGL). However, the Examiner asserts that McDonald discloses that each read and write command includes a CDB and a SGL and that one skilled in the art would be motivated to combine Jeffries with McDonald.

Claim 1 of the claimed invention specifies accumulating a plurality of commands in a queue, wherein the plurality of commands include a first CDB and a first SGL. Also, the accumulated commands include contiguous as well as non-contiguous commands. Then, the accumulated commands are examined for like commands, and the like commands corresponding to contiguous files are combined to form a single command. The newly formed single command includes a second CDB and a second SGL, wherein the second CDB and the second SGL are generated from the first CDB and the first SGL.

Jeffries teaches a disk controller for a disk drive array, which maintains two representations of all drive defects (Abstract) so that data may be recovered. Jeffries further discloses maintaining related sequences of operations together so the correct order of operations is preserved. Jeffries requires buffering of incoming requests, which are adjacent to the last n requests (Column 7, lines 53-57).

McDonald discloses a RAID system for a personal computer without the need for disk drives based on disk drive interfaces (Column 2, lines 10-12). According to McDonald, the RAID system includes an array controller card, which controls an array of disk drives. In McDonald, the array controller card is equipped with an automated coprocessor and a microcontroller. The controller card processes multiple I/O requests without interrupting the host computer.

Considering the first reference, it is respectfully submitted that independent claim 1 is not obvious in view of Jeffries. Firstly, in the claimed invention, each of the commands in the queue includes a first command data block (CDB) and a first scatter gather list (SGL). However, in Jeffries, the commands in the queue are not provided with the CDB and the SGL because the commands in the queue are not meant to be combined. In fact, Jeffries expressly states that each disk drive completes

a request prior to starting the next request, which clearly shows that commands in the queue are not meant to be combined (Column 12 lines 28-29), i.e., commands are processed sequentially. The pending requests are in the queue only to compensate for the disk drive delay.

Next, Jeffries does not teach examining whether the commands in the queue are like commands. The Examiner agrees with the Applicants in that the related sequences of operations in Jeffries refer to the order of operations and not to like commands. However, the Examiner's interpretation that the combined commands can be processed in predetermined intervals, i.e. in one cycle, is incorrect. In Jeffries, the operation requests are fragmented down to atomic operations for error handling purposes and not for combining commands at predetermined intervals. Moreover, even if the commands are processed at predetermined intervals, i.e. in one cycle, a proposition with which the applicants disagree, there is nothing in Jeffries to suggest that these commands are like commands. For example, according to Jeffries, if both a read and a write command can be fragmented into one cycle operation, then both the read and the write will be fragmented and kept together even though they are not like commands. As such, the combined commands are not limited to like commands. In other words, a read and a write operation may be kept together, even though they are not like commands and even if they are not contiguous, so long as the sequence of the operations is maintained and the operations take place within one cycle. Therefore, the portion relied on by the Examiner in Jeffries does not teach or suggest examining commands in the queue for like commands.

The Examiner further asserts that Jeffries teaches that the plurality of commands in the queue includes both contiguous and non-contiguous commands. Applicants respectfully submit that the Examiner's interpretation is incorrect because

the portion of the reference relied upon by the Examiner (Column 6, lines 28-33) does not disclose commands being in a queue. Moreover, when Jeffries discusses data as being discontinuous, Jeffries is referring to scatter/scatter operation. In such cases, the data in both the host memory and the physical location of the disk are discontinuous. The data are transferred from various locations in the memory/disk drive to various locations in the disk drive/memory using pointers. There is nothing suggesting placing contiguous as well as non-contiguous commands in a queue so that like commands can be combined.

In contrast, in the claimed invention all the incoming commands are queued. Then, the commands in the queues are examined for like commands. After that, like commands that are contiguous are combined using a first CDB and a first SGL to generate a combined command. The combined command has a new CDB and a new SGL which are derived using the first CDB and the first SGL. The new command is issued to the storage medium when the first command is processed.

To establish *prima facie* case of obviousness of the claimed invention, all the claim limitations, as combined, must be taught or suggested by the prior art and there must be some suggestion or motivation, either in the references or in the knowledge generally available to one having ordinary skill in the art, to combine the references in the manner proposed. As discussed above, Jeffries does not teach or suggest features of the claimed invention. As will be explained below, the Examiner has not established *prima facie* case of obviousness against the claimed subject matter because one skilled in the art would not have combined Jeffries and McDonald in the manner proposed by the examiner.

McDonald teaches a RAID system for a PC. The RAID system includes a controller card which controls an array of ATA disk drives. The controller card

includes an array of automated disk drive controllers, each of which controls one respective disk drive. Even though McDonald mentions a CDB, the reference does not teach or suggest combining commands. In McDonald, the device driver passes the I/O request in the general form of a CDB plus a scatter list (Column 9, lines 40-42). Moreover, according to McDonald, the microcontroller stores sequences of controller commands in drive-specific queues within the RAM and dispatches the controller commands in sequential order to corresponding automated controllers (Column 10, lines 5-9). This passing mention of the CDB and the SGL cannot reasonably be attributed to providing the requisite motivation to combine McDonald with Jeffries, especially since McDonald teaches dispatching commands from the queue in sequential order. Applicants submit that there would not have been any motivation for one having ordinary skill in the art to combine McDonald with Jeffries.

Moreover, assuming that the Examiner's assertion that there was sufficient motivation to combine McDonald with Jeffries (a proposition which the Applicants reject), the resulting invention would not lead to the claimed invention. Even if Jeffries incorporated a CDB and a SGL into their invention, there is nothing in Jeffries that would teach examining commands placed in a queue for like commands and then selecting from the like commands those commands which are contiguous using the CDB and the SGL. Moreover, the combination of Jeffries and McDonald would not have taught or suggested generating a new combined command from those like and contiguous commands. As specified in claims 1, 7, 12, and 17, the new command is provided with a new CDB and a new SGL, which are created using the old CDB and the old SGL.

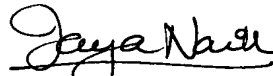
Accordingly, for at least the above-stated reasons, Applicants submit that amended independent claim 1 is patentable under 35 U.S.C § 103(a) over Jeffries in

view of McDonald. Claims 2, and 4-5, each of which depend from amended claim 1, are likewise patentable under 35 U.S.C. § 103(a) over Jeffries in view of McDonald. Chisholm and Row et al. does nothing to cure the deficiencies discussed above. Therefore, claim 5 is patentable under 35 U.S.C. § 103(a) for the same reasons stated above. Similarly, claim 7 includes the features mentioned above with reference to claim 1, therefore, at least for the reasons stated above, the amended independent claim 7 is patentable under 35 U.S.C. § 103(a) over Jeffries in view of McDonald. Claims 8, 10, and 11, each of which depend from amended claim 7, are likewise patentable under 35 U.S.C. § 103(a). Claim 12 includes the feature of a driver queue, which is configured to receive read and write commands of an operating system, and the read and write commands in the driver queue include contiguous as well as non-contiguous commands. Therefore, at least for the same reasons stated above, with respect to claim 1, claim 12 is patentable under 35 U.S.C. § 103(a) over Jeffries in view of McDonald. Dependent claims 13, and 14 depend from independent claim 12. Chisholm et al. (U.S. Patent No. 5,802,546) does nothing to cure any of the deficiencies discussed above with respect to Jeffries and McDonald. Therefore, dependent claims 13 and 14 are patentable under 35 U.S.C. § 103(a). Likewise, independent claim 17 include features mentioned above with reference to claim 1, therefore at least for the reasons stated above, claim 17 is patentable under 35 U.S.C. § 103(a) over Jeffries in view of McDonald. Claims 18 and 20 depend from amended claim 17 are likewise patentable over Jeffries.

In view of the foregoing, Applicants respectfully submit that all of the pending claims are in condition for allowance. A notice of allowance is respectfully requested. In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 774-6926. If any

additional fees are due in connection with the filing of this paper, then the Commissioner is authorized to charge such fees to Deposit Account No. 50-0805 (Order No. ADAPP206). A copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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A handwritten signature in dark ink, appearing to read "Jaya Nair", written over a horizontal line.

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